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Patentanmeldung Nr. Patent application No. Demande de brevet n°

98306520.2

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**Blatt 2 der Bescheinigung
Sheet 2 of the certificate
Page 2 de l'attestation**

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24. 08. 1998

Intelligent Network Services

Description

The present invention relates to a telephone network and a method of call processing
5 in a telephone network.

In the present application, "enhanced service" means any service provided to a
subscriber beyond connection to another terminal equipment in response to dialling
by either that subscriber or a subscriber at the terminal equipment and signalling of
10 ringing, engaged status and number unobtainable.

It is known to provide enhanced, or "intelligent network", services, such as call
barring and voice mail, in a telephone network. The processing required to
implement such services can be carried out by a telephone switching centre.
15 However, this has been found to be undesirable because telephone switching
equipment manufacturers must customise their switches according to different
customers' requirements. This increases the cost of such equipment.

An alternative approach is to use a relatively simple switching centre in conjunction
20 with an enhanced service processing apparatus, or "service control point". In this
arrangement, the switching centre notifies the enhanced service processing apparatus
of an attempt to establish a call connection and the enhanced service processing
apparatus returns switching control commands such as "proceed as normal" or "bar
call". A disadvantage with this arrangement is that there is often a lot of traffic
25 between switching centres and the enhanced service processing apparatus consisting of
notifications of call connection establishment attempts and "proceed as normal"
commands.

It is an aim of the present invention to solve or ameliorate the aforementioned
30 problem.

According to the present invention, there is provided a telephone network comprising a telephone switching centre coupled to a subscriber line and being responsive to an attempt to establish or terminate a call connection via the subscriber
5 line to notify selectively an enhanced service processing apparatus of that attempt on the basis of the previous occurrence of a predetermined event associated with the subscriber line, the enhanced service processing apparatus being responsive to such notification to send switching control commands to the telephone switching centre. As a consequence, traffic between the switching centre and the enhanced services
10 processing apparatus only occurs when there is the possibility at least of a switching control command meaning other than "proceed as normal".

Preferably, the switching centre includes processing means including flag means, the processing means being responsive to notification of said predetermined event to
15 change the state of said flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line, to notify selectively the enhanced service processing apparatus of the attempt in dependence on the state of the flag means.

20 Preferably, event detecting means is included for detecting a predetermined event and notifying the switching centre of an occurrence of said event.

Preferably, the processing means includes a plurality of flag means associated with respective predetermined events, the processing means being responsive to
25 notification of one of said predetermined events to change the state of the associated flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line, to notify selectively the enhanced service processing apparatus of the attempt in dependence on the states of the flag means together with the flag means state information. More preferably, the enhanced service processing apparatus
30 generates said switching control commands in dependence on said flag state information.

The event detecting means may comprise a voice mail system, in which case the event or one of the events comprises storing of voice mail for the subscriber of said subscriber line. The event detecting means may comprise a call charging system, in which case the event or one of the events comprises the call charge for the subscriber of said subscriber line exceeding a threshold value.

According to the present invention, there is also provided a method of call processing in a telephone network comprising the steps of:-

- 10 recording the occurrence of a predetermined event at a telephone switching centre, said event being associated with a subscriber line from the switching centre; detecting an attempt to establish or terminate a call via the subscriber line;
- determining whether a record of the occurrence of said predetermined event exists at the switching centre; and
- 15 if it is determined that a record of the occurrence of said predetermined event exists at the switching centre:-
 - notifying an enhanced service processing apparatus of the attempt;
 - generating switching control commands at the enhanced service processing apparatus; and
 - 20 communicating said commands to the switching centre.

The event may comprise, for example, storing of voice mail or call charges exceeding a threshold value.

- 25 An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 illustrates part of a telephone system;

Figure 2 illustrates switching centre of the telephone system of Figure 1; and

Figure 3 is a flow diagram illustrating the operation of the system of Figure 1.

30

Referring to Figure 1, a telephone system comprises a terminal equipment 1, for

instance a telephone set, connected by a telephone line to a switching centre 2. The switching centre is connected to the rest of the Public Switched Telephone Network 3 and also to a service control point 4. The service control point 4 provides instructions to the switching centre 2 for the provision of enhanced services.

5

Referring to Figure 2, the switching centre comprises a digital switching matrix 5, a plurality of subscriber line cards 6 connected to the switching matrix 5, a plurality of trunk interfaces 7 also connected to the switching matrix 5, a control processor 8 and a plurality of signalling interfaces 9, some of which are coupled to subscriber lines and some of which are connected to trunks. The control processor 8 controls the operation of the digital switching matrix 5 in response to signalling data from the signalling interfaces 9 and switching control commands from the service control point 4. The control processor 8 also receives data from and sends data to a call charging subsystem 10.

15

The operation of the exemplary embodiment of Figures 1 and 2 will now be described.

It is known for a calling party to be offered the opportunity of leaving a voice mail message in the event that the called party does not answer the call. This known process differs in a system according to the present invention in that an "end of call-voice mail" flag, or trigger, is set in the control processor 8 when voice mail is left.

20

When the called party subsequently makes a call and that call terminates, the control processor 8 notes that the "end of call-voice mail" flag is set and calls the service control point 4, sending the identity of the flag and the identity of the subscriber. The service control point 4 responds by returning switching control commands to the control processor 8 of switching centre 2 to cause it to connect the subscriber to a voice mail centre so that he can listen to his voice mail.

25

30

Another function provided by the present embodiment is call barring in the event of

call charges reaching a limit value. In order to provide this function, the control processor 8 implements an "start of call - excess charge" flag. Normally, this flag is set to false. Accordingly, when the subscriber makes a call, the call is routed by the switch centre 2 without reference to the service control point 4. However, if the cost of the subscriber's calls exceed a threshold value, the call charging sub-system 10 notifies the switching centre 2 which then sets the "start of call - excess charge" flag. Consequently, when the subscriber now attempts to make a call, the control processor 8 detects that the call is being made and that the "start of call - excess charge" flag is set, and notifies the service control point 4. The service control point 4 then returns call barring commands to the control processor 8 of the switching centre 2. The control processor 8 responds by controlling to switching matrix 5 so as to bar the subscriber's call.

Referring to Figure 3, it will be appreciated that the operation of a system according to the present invention may be generalised as follows.

A first process of the control processor 8 monitors the signalling interfaces 9 for predetermined events (step s1-1) and, if one of the predetermined events is detected, it sets a flag (step s1-2). In the same process, the control processor 8 checks for incoming notification signals from other system control and administration components, e.g. a call charging sub-system, (step s1-3) and, if such signals are received, sets corresponding flags (step s1-4).

A second process of the control processor 8 comprises determining that a party is attempting to set up call (step s2-1) and determining whether any relevant flags, i.e. flags associated with one or other of the would-be parties to the call, are set (step s2-2). If a flag is set, the control processor 8 communicates this information to the service control point 4 (step s2-3) together with the identity of the party to which the flag relates. The control processor 8 then receives switching control commands back from the service control point 4 (step s2-4) and implements them (step s2-5). If no flags are set, the call is routed without reference to the service control point 4.

- 6 -

A third process of the control processor 8 comprises determining that a call is being terminated (step s3-1) and determining whether any relevant flags, i.e. flags associated with one or other of the parties to the call, are set (step s3-2). If a flag is set, the
5 control processor 8 communicates this information to the service control point 4 (step s3-3) together with the identity of the party to which the flag relates. The control processor 8 then receives switching control commands back from the service control point 4 (step s3-4) and implements them (step s3-5). If no flags are set, the call
10 terminates in the normal manner with no reference being made to the service control point 4.

If will be appreciated that flags associated with many different events may be implemented and that the present invention is not limited to the illustrative examples described above.

24. 08. 1998

Claims

1. A telephone network comprising a telephone switching centre coupled to a subscriber line and being responsive to an attempt to establish or terminate a call connection via the subscriber line to notify selectively an enhanced service processing apparatus of that attempt on the basis of the previous occurrence of a predetermined event associated with the subscriber line, the enhanced service processing apparatus being responsive to such notification to send switching control commands to the telephone switching centre.
- 10 2. A network according to claim 1, wherein the switching centre includes processing means including flag means, the processing means being responsive to notification of said predetermined event to change the state of said flag means and, in the event of an attempt to establish a call connection via said subscriber line, to notify
15 selectively the enhanced service processing apparatus of the attempt in dependence on the state of the flag means.
3. A network according to claim 1 or 2, including event detecting means for detecting a predetermined event and notifying the switching centre of an occurrence
20 of said event.
4. A network according to claim 2, wherein the processing means includes a plurality of flag means associated with respective predetermined events, the processing means being responsive to notification of one of said predetermined events
25 to change the state of the associated flag means and, in the event of an attempt to establish or terminate a call connection via said subscriber line, to notify selectively the enhanced service processing apparatus of the attempt in dependence on the states of the flag means together with the flag means state information.
- 30 5. A network according to claim 4, wherein the enhanced service processing apparatus generates said switching control commands in dependence on said flag state

information.

6. A network according to claim 3, 4 or 5, wherein the event detecting means comprises a voice mail system and the event or one of the events comprises storing of
5 voice mail for the subscriber of said subscriber line.
7. A network according to any one of claims 3 to 6, wherein the event detecting means comprises a call charging system and the event or one of the events comprises the call charge for the subscriber of said subscriber line exceeding a threshold value.
- 10
8. A method of call processing in a telephone network comprising the steps of:-
recording the occurrence of a predetermined event at a telephone switching centre,
said event being associated with a subscriber line from the switching centre;
detecting an attempt to establish or terminate a call via the subscriber line;
15 determining whether a record of the occurrence of said predetermined event exists at
the switching centre; and
if it is determined that a record of the occurrence of said predetermined event exists at
the switching centre:-
notifying an enhanced service processing apparatus of the attempt;
20 generating switching control commands at the enhanced service processing
apparatus; and
communicating said commands to the switching centre.
9. A method according to claim 8, wherein said event comprises storing of voice
25 mail.
10. A method according to claim 8, wherein said event comprises call charges
exceeding a threshold value.

Abstract

24. 08. 1998

Intelligent Network Services

In a telephone network, a service control point (4) is called by a switching centre (2),
5 if a flag has previously been set by some event, e.g. call charges crossing a threshold or
the leaving of a voice mail message, when a call is being established or terminated.

The switching centre (2) then operates in accordance with commands returned by the
service control point (4). If no flags have been set the service control point (4) is not
called, the call is treated by the switching centre (2) in a default manner.

10 (Figure 2)

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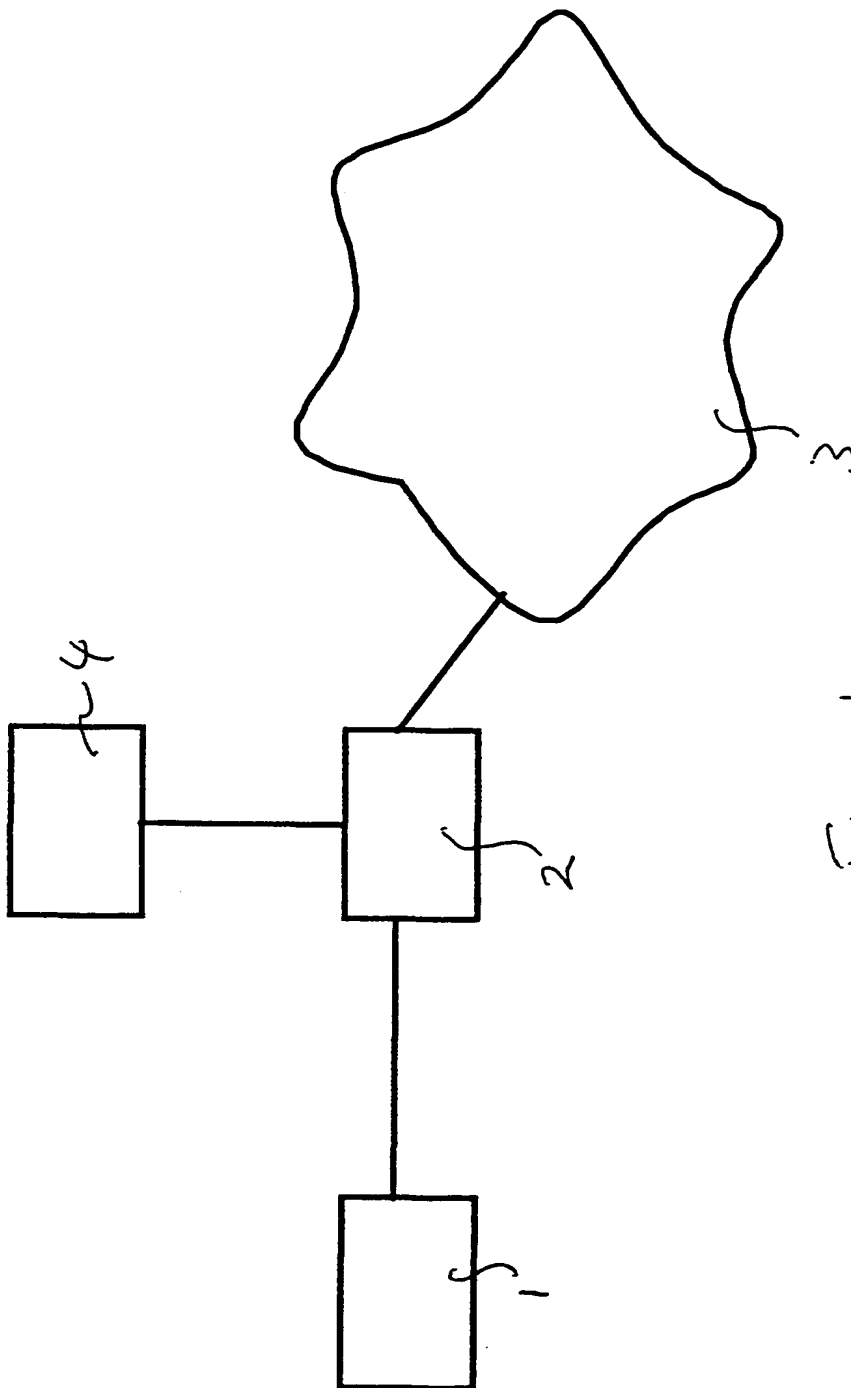


Fig. 1

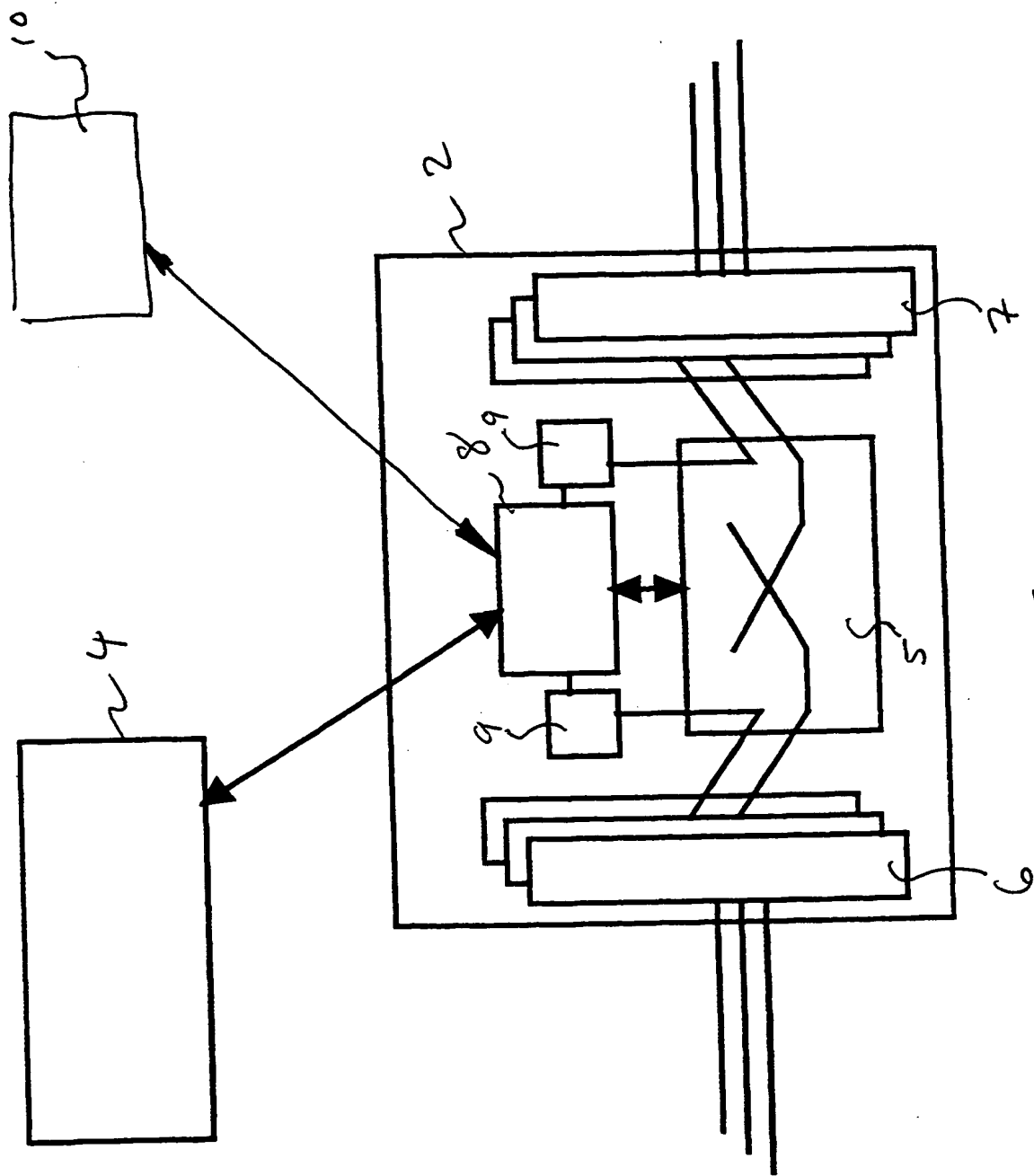


Fig. 2.

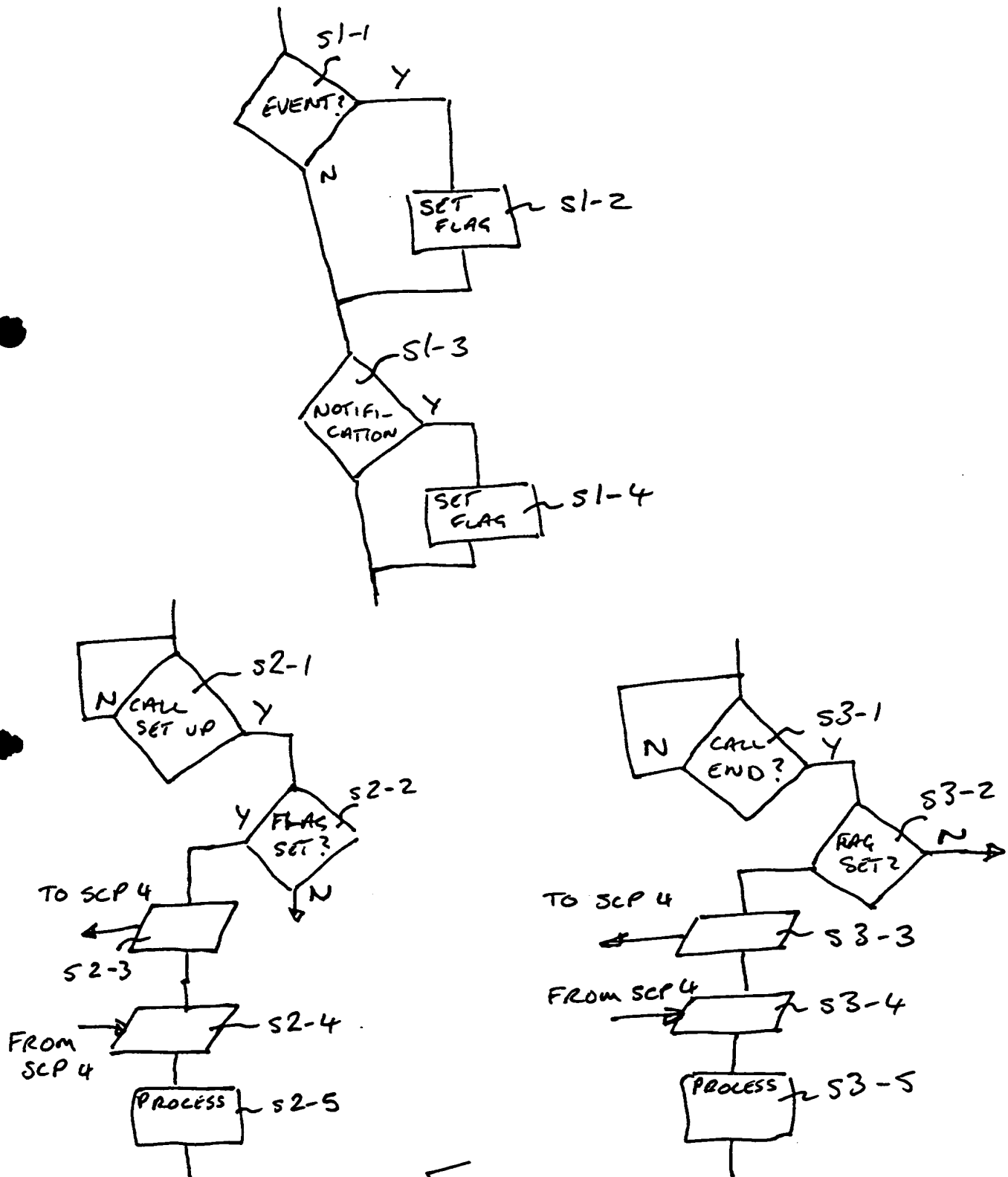


Fig. 3.

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